

REDISCOVERY OF *SCOLEBYTHUS MADECASSUS*,  
WITH A DESCRIPTION OF THE MALE AND OF  
THE FEMALE STING APPARATUS  
(HYMENOPTERA: SCOLEBYTHIDAE)

BY HOWARD E. EVANS,<sup>1</sup> CHARLES KUGLER,<sup>2</sup>  
AND WILLIAM L. BROWN, JR.<sup>2</sup>

INTRODUCTION

*Scolebythus madecassus* was described by Evans (1963) from a single female taken by Wulsin at Mandritsara, Madagascar. It is the monotype of the genus *Scolebythus*, which in turn is the type genus of family Scolebythidae, a small and rare taxon related to Bethyliidae, containing two other monotypic genera in addition to *Scolebythus*: *Clystopsenella* (widespread in Brasil) and *Ycaploca* (South Africa and Australia). Females and males were known for all of these genera except *Scolebythus*, in which only the female holotype has been collected until now (Evans 1963, Nagy 1975, Day 1977).

During February 1977, one of us (WLB) found six living specimens of *Scolebythus madecassus* in a single small piece of rotten wood in disturbed rain forest along the road south from Andasibé (formerly Périnet), Madagascar, about 1 km from the railroad station and hotel. One of the females among these has been compared with the holotype (MCZ) by WLB, and is considered to be conspecific.

The collection was made at about 14.00 hr, just at the beginning of a heavy thundershower, on a heavily shaded part of the forest floor, where WLB was searching for ants. A small, very rotten stick, about 15 cm long by 3 cm thick, was picked up out of the leaf litter and twisted by hand, so that one end of the stick was split open. A small black wasp, appearing in life like a large, long-necked bethylid, was found in the large, irregular chamber thus breached;

<sup>1</sup>Department of Zoology and Entomology, Colorado State University, Fort Collins, Colorado 80523.

<sup>2</sup>Department of Entomology, Cornell University, Ithaca, N.Y. 14853. Present address: Department of Biology, Radford University, Radford, VA 24142.

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the wasp stayed still, clinging to the wall of the chamber, but when picked out with finger and thumb, it stung the thumb, producing a sting about like that of a honeybee in intensity of pain and duration. For a few seconds the wasp eluded capture and ran slowly over the captor's hands, without attempting to fly. It was soon put into alcohol.

Next, the other end of the stick was twisted open, though without much expectation of finding anything — unfortunately, because in the darkness and confusion of the storm's beginning, it was not seen what part of the stick's contents were dropped on the ground and lost. What was found within were five more of the wasps, all resting in one large, irregular, continuous chamber or hollow. Some ran slowly over the collector's hands before being put into a plastic bag with the remains of the stick, and it is not known whether there had been more wasps that escaped clean away without being seen. Later indoor examination of the fragments of rotten stick turned up only the five adult wasps (four females and one male) in addition to the one female put in alcohol at the collection site.

The significance of this aggregation is unknown. The wasps are fully pigmented, and do not seem to have been associated with cocoons or large prey remains. They were resting together in hollows (beetle or millipede burrows?) much larger than their own bodies. Perhaps this was a "sleeping aggregation" during daylight hours (or rainy weather). In temperate areas, certain Bethyilidae form clusters under the bark of trees during the winter (e.g., *Holepyris habilis*, Evans 1977).

There is also the remote possibility that *Scolecbythus* is at some relatively advanced stage of presocial behavior. The unfortunate circumstance that much of the contents of the stick were dropped and lost prevents us from knowing whether eggs or small brood, or possible small prey, may have been present. One of the females, chosen at random, was dissected, and the ovaries proved to contain a number of elongate ova. It seems useless to speculate further about these matters without more evidence, but it is worth emphasizing that the kind of aggregation observed is unusual and should be investigated from the life-history and behavioral points of view.

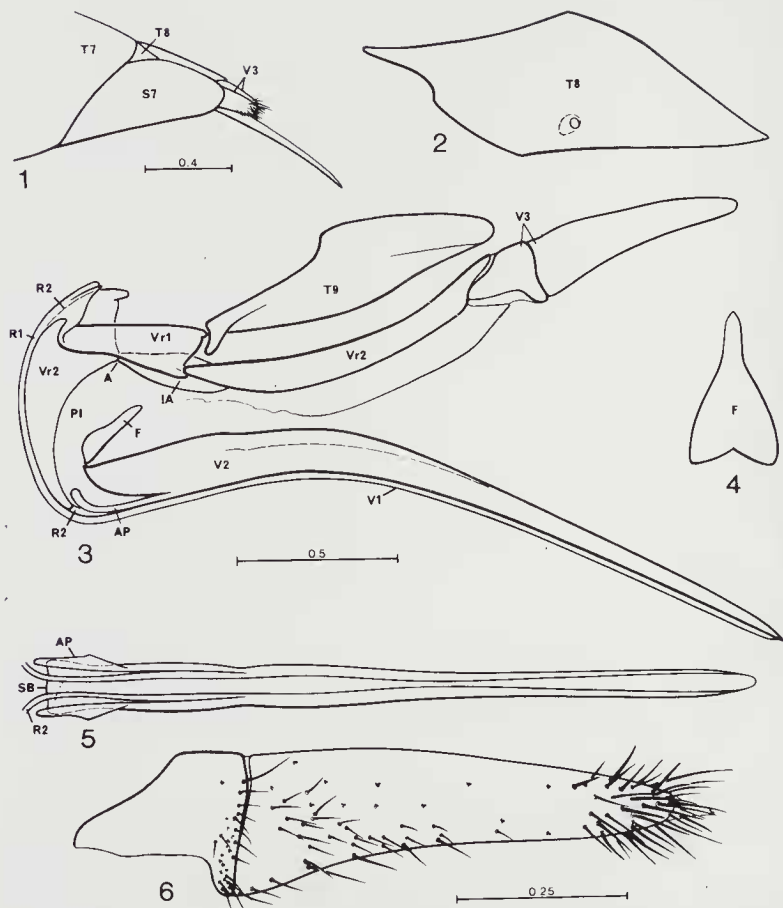
#### STING APPARATUS (Figs. 1-6)

The following description is based on a single specimen, prepared as described in Kugler (1978). The terminology is that of Daly

(1955) and Oeser (1961), but other commonly used synonyms are given as well. Numbers of abdominal, rather than metasomal, segments are used throughout.

Apparatus not completely internalized; sides of sternum 7 large, enclosing all but a small triangle of tergum 8 and tips of third valvulae and aculeus (Fig. 1). Eighth tergum (spiracular plate) (Fig. 2) subconical in dorsal view, not reduced mesad, with heavy antecostal ridge that terminates anterolaterally in long acute processes. Ninth tergum (quadrate plates) (Fig. 3) completely divided medially by membrane, narrow (max W/max L = 35%) moderately sclerotized, apodeme prominent only in upper half of length. No tenth tergum (anal plate). First valvifers (triangular plates, gonocoxites 8) (Fig. 3) long and slender; attached to near the apex of first ramus, but slung beneath it on a narrow stalk. First valvulae (lancets, gonapophyses 8) (Fig. 3) long, very slender, acute; each with a large proximal valve and a smaller, weaker distal valve; apex with a single small barb and 3 tiny denticles. Dorsal lamina (above groove) sclerotized only in distal third of length from valves. Second valvifers (oblong plates, gonocoxites 9) (Fig. 3) hinged between the dorsal and ventral arms. Dorsal arm long and narrow, its ventral edge grading into membrane cephalad; intervalvifer articulations with 23 and 27 trichoid sensilla. Ventral arm curved and evenly tapered to articular process of sting; second rami with 63 and 67 trichoid sensilla present on all but extreme ends. Second valvulae (sting, gonapophyses 9) (Fig. 3) moderately arched so that tip is directed obliquely ventrad. Profile tapers evenly to tip, which is about twice as wide as high and is free of ridges and barbs. Placoid or coeloconic sensilla present along caudal 45% of length, increasingly dense apicad. Sting base truncate, with rounded shoulders when seen from below (Fig. 5), not arched when viewed from the front. Articular processes long, slender and curved. Furcula (Figs. 3, 4) with short, blunt ventral arms that do not curve over sides of sting base. Third valvulae (gonostyli) (Figs. 3, 6) 2-segmented, both parts well sclerotized and with numerous trichoid and basiconic sensilla.

The morphology of the *Scolebythus madecassus* sting apparatus supports the close association of the Scolebythidae with the Bethyliidae (Evans, 1963; Brothers, 1975), rather than with Sapygidae or Anthoboscinae (Evans, 1963). The presence of a furcula and postincision (incisura postarticularis of Oeser), and lack of socii (pygostyles, cerci) separates *Scolebythus* from the terebrantes (though siricids and some proctotrupids lack socii) (Oeser, 1961,



Figs. 1-6. Sting apparatus of *Scolobythus madecassus*. 1. Lateral and slightly dorsal view of end of abdomen of female. 2. Lateral view of eighth abdominal tergum. 3. Lateral view of sting apparatus. 4. Anterior view of furcula. 5. Ventral view of second valvulae (sting). 6. Lateral view of third valvula (gonostylus). Figures 2, 3 and 5 to same scale; 4 and 6 to same scale; all in millimeters. A, articulation of dorsal and ventral arms of second valvifer; AP, articular process; F, furcula; IA, intervalvifer articulation; PI, postincision (incisura postarticularis); R1, first ramus; R2, second ramus; S7, seventh abdominal sternum; SB, sting base; T7, T8, T9, seventh, eighth and ninth abdominal terga; V1, first valvula (lancet); V2, second valvulae (sting); V3, third valvula (gonostylus); Vr1, first valvifer (triangular plate); Vr2, second valvifer (oblong plate).



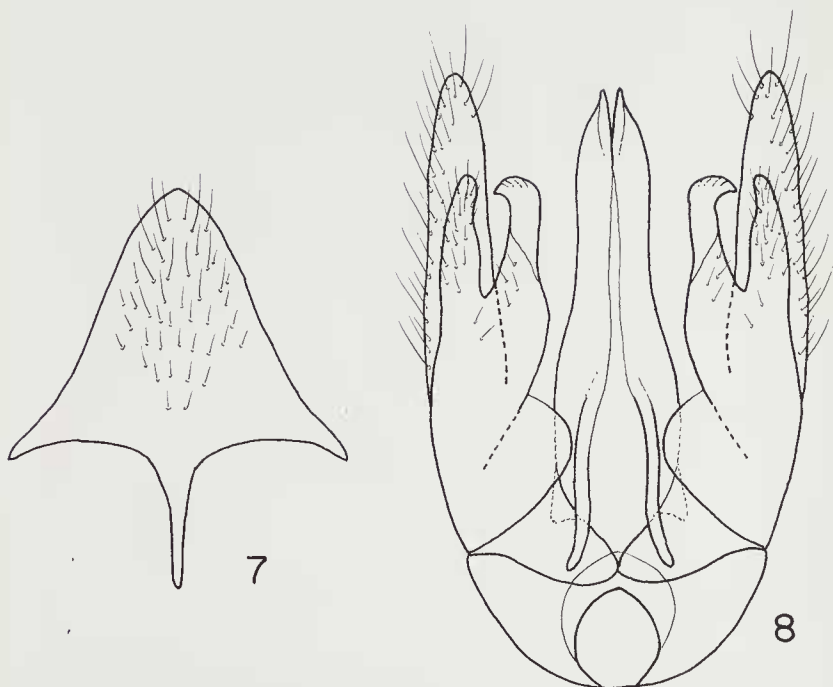
1962). Then the incomplete closure of the abdomen by the seventh segment and the articulated second valvifer separates *Scolebythus* from other aculeates, and its half-cone shaped eighth tergum places it more specifically with the Bethylidae, rather than the Cleptidae or Chrysididae (Zander, 1899; Oeser, 1961; Brothers, 1975). The affinity of the bethylids and *Scolebythus* can clearly be seen by comparing this description with that of *Cephalonomia* sp. (Oeser, 1961:74-75, 119; figs. 101-105). The degree of internalization of the apparatuses is the same, as are the shapes of the seventh sterna and eighth terga. Also similar are the ninth hemitergites, the first and second valvifers, and the first and second valvulae. *Cephalonomia* differs in having a more reduced apodeme on the ninth tergum, 1-segmented third valvulae, a distinctly V-shaped furcula, a somewhat differently shaped sting base, and long, narrow processes that extend from the dorsal arm of each second valvifer to the fulcral processes of the sting.

#### DESCRIPTION OF MALE (Figs. 7-8)

The single male is smaller than any known female, measuring 5.5 mm in length, the fore wings 4.1 mm (body length of the females varies from 7 to 9 mm). Color of body, appendages, and wings similar to female. Mouthparts and clypeus as in female; antennae 13-segmented, very slightly more slender than in female, but similar in length of individual segments and in total length. Temples less well developed than in female, and head not much produced above eye tops, the vertex forming a smooth arc between eye tops. Minimum distance between eyes  $1.1 \times$  eye height, inner orbits closest near the middle, as in female. Thorax essentially as in female in all details, including legs and wings; scutellum with a well formed basal transverse groove (this is also true in the females; see below).

Abdomen slightly more slender than in female, with 7 distinct segments. Socii (pygostyles) absent; subgenital plate tongue-shaped (Fig. 7). Aedeagus large, with a pair of acute apical processes; parameres slightly exceeding the aedeagus, slender and somewhat hirsute; volsellae with the cuspis finger-like, digitus expanded and acute lateroapically (Fig. 8).

The subgenital plate resembles closely that of *Clystopenella longiventris*, as figured by Day (1977). The genitalia also resemble



Figs. 7-8. Male terminalia of *Scolebythus madecassus*, ventral aspect. 7. Subgenital plate. 8. Genitalia.

that species, except that the parameres are more elongate. The genitalia of *Ycaploca evansi* as figured by Nagy (1975) appear to lack one element in the volsella, but they are otherwise basically similar. The genitalia of three genera of Scolebythidae thus appear to be very similar and of the basic bethylid type. The lack of socii is also a bethylid feature; these structures appear to be present in most Scolioidea and most other Aculeata.

One further point needs to be made. In the original description of *Scolebythus* it was stated that the scutellum has a "pair of widely separated, transverse pits". In fact, all specimens in the present series have a transverse groove at the base of the scutellum. The "transverse pits" represent a misinterpretation of the structure of the type specimen of *madecassus*, where the groove appears to be closed except laterally. This feature cannot be used to separate *Scolebythus* and *Ycaploca*, as Nagy (1975) has done, but one must rely on the

presence of a prominence between the eyes and the much shorter malar space in the latter genus.

REFERENCES CITED

- BROTHERS, D. J.  
1975. Phylogeny and classification of the aculeate Hymenoptera, with special reference to Mutillidae. Univ. Kans. Sci. Bull. **50**: 483-648.
- DALY, H. V., JR.  
1955. A comparative study of the sting of aculeate Hymenoptera. Unpublished M.A. thesis, University of Kansas; pp. i-iv, 1-67, + 7 pl.
- DAY, M. C.  
1977. A new genus of Plumariidae from southern Africa, with notes on Scolebythidae (Hymenoptera: Chrysoidea). Cimbebasia, Windhoek, Namibia (A) **4**: 171-177.
- EVANS, H. E.  
1963. A new family of wasps. Psyche **70**: 7-16.  
1977. A revision of the genus *Holepyris* in the Americas (Hymenoptera: Bethyridae). Trans. Amer. Ent. Soc. **103**: 531-579.
- KUGLER, C.  
1978. A comparative study of the myrmicine sting apparatus (Hymenoptera, Formicidae). Stud. Entomol. **20**: 413-548.
- NAGY, C. G.  
1975. A new genus of Scolebythidae (Hymenoptera) from South Africa and Australia. J. Ent. Soc. S. Africa **38**: 75-78.
- OESER, R.  
1961. Vergleichend-morphologische Untersuchungen über den Ovipositor der Hymenopteren. Mitt. Zool. Mus. Berlin **37**: 3-119.  
1962. Der reduzierte Ovipositor von *Pseudogonalos hahni* (Spin.) nebst Bemerkungen über die systematische Stellung der Trigonalidae. Tagungsber. Deutsch. Akad. Landwirts.-wiss. **45**: 153-157.
- ZANDER, E.  
1899. Beiträge zur Morphologie des Stachelapparates der Hymenopteren. Z. Wiss. Zool. **66**: 289-333.